REGULATING MECHANISM FOR GAP OF PLATEN

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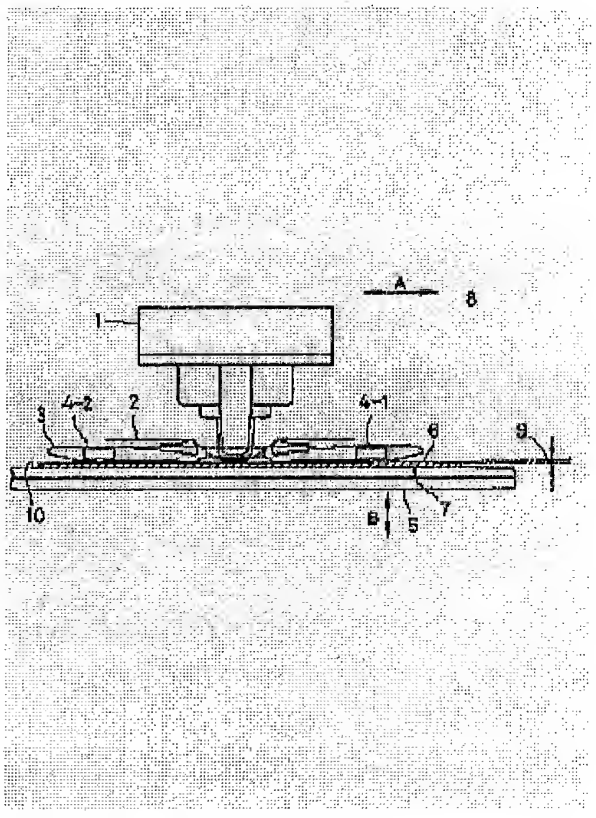
Abstract of **JP5169762**

PURPOSE:To prevent generation of printing failure and to enable high-speed printing. CONSTITUTION:Detecting sensors 4-1, 4-2 for thickness of a medium are provided on the inner face of a card holder 3 which performs spacing together with a printing head 1 while holding prescribed distance in the spacing direction from the printing head 1. The detecting sensors 4-1, 4-2 for thickness of the medium detect the thickness of the medium 6 at a point precedent by a prescribed distance to the position where the printing head 1 performs printing. A signal processing circuit 8 performs arithmetic processing for the detected result of the detecting sensors 4-1, 4-2. A platen 5 is moved by an actuator on the basis of the computed result.



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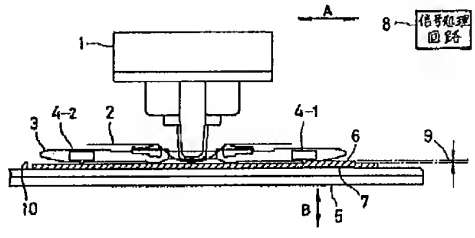
(54)【発明の名称】　プラテンギャップ調整機構

(57)【要約】

【目的】　印字不良の発生を防止し、高速印字を可能とする。

【構成】　プリントヘッド１と一緒にスペーシングを行うカードホルダ３内面には、プリントヘッド１からスペーシング方向に所定距離をもって媒体厚さ検知センサ４-1，４-2が設けられている。媒体厚さ検知センサ４-1，４-2は夫々プリントヘッド１が印字を行っている位置よりも所定距離だけ前で媒体６の厚さを検知する。信号処理回路８は媒体厚さ検知センサ４-1，４-2の検知結果に対して演算処理を行い、この演算結果に基づいてプラテン５をアクチュエータで移動させる。



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【特許請求の範囲】

【請求項1】　プラテン上の印字媒体に、前記印字媒体を案内する案内部材とともに移動するプリントヘッドで印字を行う印字装置のプラテンギャップ調整機構であって、前記プリントヘッドの移動方向前方側の前記案内部材内に前記プリントヘッドから所定距離をもって設けられ、前記印字媒体の厚さを検知する検知手段と、前記検知手段の検知結果に応じて前記プラテンと前記プリントヘッドとの間隔を可変する調整手段とを設けたことを特徴とするプラテンギャップ調整機構。

【発明の詳細な説明】

【0001】

【技術分野】本発明はプラテンギャップ調整機構に関し、特に不均一厚さの媒体を印字する印字装置のプラテンギャップ調整機構に関する。

【0002】

【従来技術】従来、プラテンギャップ調整機構においては、プリントヘッドとプラテンとの間のプラテンギャップを調整するために媒体厚さ検知機構をプリンタユニットの前に設け、この媒体厚さ検知機構の検知結果に応じてプラテンをアクチュエータで移動させる構造となっている。

【0003】これに対して、プラテンを固定し、プリントヘッドをスプリングにてプラテン側に付勢しておいて、媒体の厚さに応じてプリントヘッドを退避する構造のものもある。

【0004】このような従来のプラテンギャップ調整機構では、プリンタユニットの前に設けた媒体厚さ検知機構の検知結果に応じてプラテンギャップを調整する構造の場合、一旦プラテンギャップを調整すると次の調整時期がくるまで一定のプラテンギャップで印字を行うため、媒体の厚さが不均一のときにプリントヘッドと媒体とのギャップが不均一のまま印字が行われて印字不良が発生することがあるという問題がある。

【0005】また、プラテンを固定してプリントヘッドをスプリングにてプラテン側に付勢する構造の場合、プリントヘッドを常に媒体に押付けながら印字を行うため、プリントヘッドを移動して印字を行うときに媒体による抵抗が大きくなり、高速印字を行うことができないという問題がある。

【0006】

【発明の目的】本発明は上記のような従来のものの問題点を除去すべくなされたもので、印字不良の発生を防止することができ、高速印字を可能とすることができるプラテンギャップ調整機構の提供を目的とする。

【0007】

【発明の構成】本発明によるプラテンギャップ調整機構は、プラテン上の印字媒体に、前記印字媒体を案内する案内部材とともに移動するプリントヘッドで印字を行う印字装置のプラテンギャップ調整機構であって、前記プリントヘッドの移動方向前方側の前記案内部材内に前記プリントヘッドから所定距離をもって設けられ、前記印字媒体の厚さを検知する検知手段と、前記検知手段の検知結果に応じて前記プラテンと前記プリントヘッドとの間隔を可変する調整手段とを設けたことを特徴とする。

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【0008】

【実施例】次に、本発明の一実施例について図面を参照して説明する。

【0009】図1は本発明の一実施例を示す構成図である。図において、プラテン5はプリントヘッド1およびインクリボン2と媒体6とが所定のプラテンギャップとなるようにプリントヘッド1に対向して配設されている。

【0010】また、プリントヘッド1が取付けられた部材（図示せず）には媒体6を案内するためのカードホルダ3が取付けられている。このカードホルダ3はプリントヘッド1が矢印Aの方向に移動して印字を行うときにプリントヘッド1と一緒にスペーシングを行うようになっている。

【0011】このカードホルダ3内のプラテン5と対向する面には、プリントヘッド1をはさんでプリントヘッド1からスペーシング方向に所定距離をもって夫々媒体厚さ検知センサ4-1，4-2が設けられている。これら媒体厚さ検知センサ4-1，4-2は夫々プリントヘッド1が媒体6上をスペーシングしながら印字を行うとき、プリントヘッド1が印字を行っている位置よりも所定距離だけ前で媒体6の厚さを検知している。

【0012】媒体厚さ検知センサ4-1，4-2で検知された媒体6の厚さは信号処理回路8に送出される。信号処理回路8は媒体厚さ検知センサ4-1，4-2の検知結果に対して演算処理を行い、この演算結果に基づいてプラテン5を図示せぬアクチュエータで矢印Bの方向に移動させる。

【0013】図2は本発明の一実施例の動作を示す図である。図においては、媒体6の裏面にシール7が貼付されている場合にプリントヘッド1が媒体厚さ検知センサ4-1側に移動するときの動作を示している。

【0014】この場合、媒体厚さ検知センサ4-1はプリントヘッド1のスペーシングに伴ってシール7が貼付された部分で媒体6の厚さの変化を検知すると、検知結果を信号処理回路8に送出する。信号処理回路8は媒体厚さ検知センサ4-1，4-2の検知結果に対して演算処理を行い、プリントヘッド1がシール7の貼付された部分に達したときに、プリントヘッド1と媒体6とが所定のプラテンギャップとなるように、プラテン基準面10に対して厚さ変化分9だけプラテン5をアクチュエータで矢印Cの方向に移動させる。

【0015】その後、媒体厚さ検知センサ4-1はプリントヘッド1のスペーシングに伴ってシール7が貼付された部分を通過すると、再度媒体6の厚さの変化を検知し

て信号処理回路８に通知する。よって、信号処理回路８はプリントヘッド１がシール７の貼付された部分を通過すると、プラテン５を元の位置つまりプラテン基準面１０の位置に移動させる。

【００１６】一方、プリントヘッド１が媒体厚さ検知センサ４-2側に移動するとき、媒体６の厚さの変化は媒体厚さ検知センサ４-2によって検知されるので、信号処理回路８は媒体厚さ検知センサ４-2の検知結果にしたがってプラテン５を移動させる。

【００１７】図３は図１の媒体厚さ検知センサ４-1の構成を示す図である。図において、カードホルダ３内の媒体厚さ検知センサ４-1の発光素子（ＬＥＤ）４ａから出射された光束１１は投光レンズ４ｂによって集光されて媒体６上に照射される。媒体６上で拡散反射された光線の一部は受光レンズ４ｃを通過して位置検出素子（ＰＳＤ）４ｄ上にスポットを形成する。

【００１８】このとき、媒体６の裏面にシール７が貼付されているときと貼付されていないときとでは、位置検出素子４ｄ上のスポット形成位置が異なってくる。このスポット形成位置の違いによって位置検出素子４ｄから信号処理回路８への電圧値が変化する。

【００１９】信号処理回路８では位置検出素子４ｄからの電圧値と媒体６の厚さとを対応付けて図示せぬテーブル内に予め格納してあるので、該テーブルを参照して位置検出素子４ｄからの電圧値に対応する媒体６の厚さを算出する。信号処理回路８はプリントヘッド１が所定距離だけ移動したときに、すなわちプリントヘッド１がシール７が貼付された位置にきたときにプラテン５を算出した媒体６の厚さの変化分だけ移動する。

【００２０】尚、プラテン５の移動方向、つまりプリントヘッド１に近付けるのかまたは遠ざけるのかは位置検出素子４ｄの電圧値が基準値に対して大か小かで決定する。また、媒体厚さ検知センサ４-2の構成も上述した媒体厚さ検知センサ４-1と同様の構成となっており、その動作も媒体厚さ検知センサ４-1と同様である。

【００２１】図４は本発明の一実施例の動作を示すフローチャートである。これら図１～図４を用いて本発明の一実施例の動作について説明する。

【００２２】プリントヘッド１が媒体６上をスペーシングしながら印字を行うとき（図４ステップ１１）、媒体厚さ検知センサ４-1，４-2はプリントヘッド１が印字を行っている位置よりも所定距離だけ前で媒体６の厚さを検知している（図４ステップ１２）。

【００２３】信号処理回路８は媒体厚さ検知センサ４-1，４-2からの電圧値の変化から算出した媒体６の厚さが設定範囲内か否かをチェックする（図４ステップ１３）。信号処理回路８は算出した媒体６の厚さが設定範囲内であれば、印字終了か否かを判定する（図４ステップ１６）。

【００２４】また、信号処理回路８は算出した媒体６の厚さが設定範囲内でなければ、媒体６の厚さを検出した位置までプリントヘッド１がスペーシングされてきたときに（図４ステップ１４）、設定値と測定値との差だけプラテン５を移動させる（図４ステップ１５）。その後に、信号処理回路８は印字終了か否かを判定する（図４ステップ１６）。

【００２５】このように、プリントヘッド１とともにスペーシングするカードホルダ３内に媒体厚さ検知センサ４-1，４-2を設け、媒体厚さ検知センサ４-1，４-2および信号処理回路８によってプリントヘッド１の印字位置よりも所定距離前で媒体６の厚さを算出し、その算出結果にしたがってプラテン５を移動させるようにすることによって、不均一厚さの媒体６に対して印字を行う場合でも媒体６の厚さに応じてプラテン５が移動するので、プリントヘッド１と媒体６との間が常に所定のプラテンギャップとなる。よって、印字汚れや印字位置不良などの印字不良を防止することができ、印字品位を向上させることができる。また、プリントヘッド１を移動して印字を行うときに媒体６による抵抗を小さくすることができるので、高速印字を可能とするとができる。

【００２６】

【発明の効果】以上説明したように本発明によれば、プリントヘッドから所定距離をもって、プリントヘッドの移動方向前方側の案内部材内に検知センサを設け、この検知センサの検知結果に応じてプラテンとプリントヘッドとの間隔を可変するようにすることによって、印字不良の発生を防止することができ、高速印字を可能とするとができるという効果がある。

【図面の簡単な説明】

【図１】本発明の一実施例を示す構成図である。

【図２】本発明の一実施例の動作を示す図である。

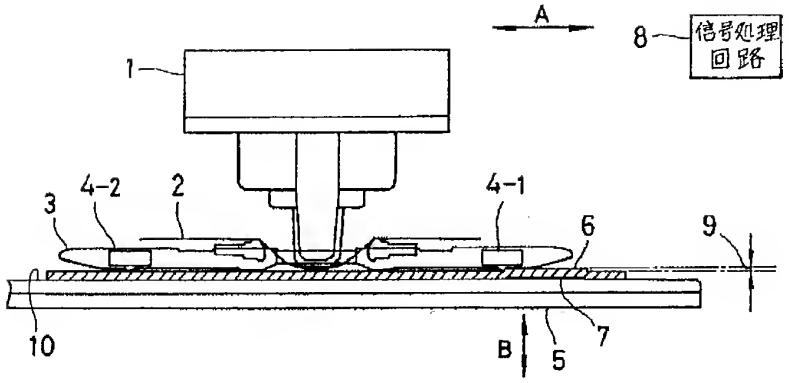
【図３】図１の媒体厚さ検知センサの構成を示す図である。

【図４】本発明の一実施例の動作を示すフローチャートである。

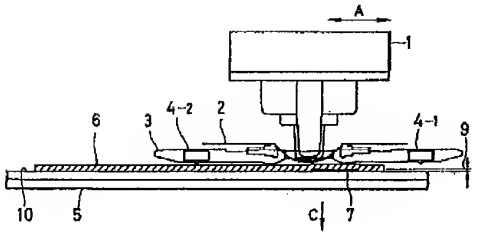
【符号の説明】

１　プリントヘッド
３　カードホルダ
４-1，４-2　媒体厚さ検知センサ
４ａ　発光素子
４ｂ　投光レンズ
４ｃ　受光レンズ
４ｄ　位置検出素子
５　プラテン
６　媒体
７　シール
８　信号処理回路

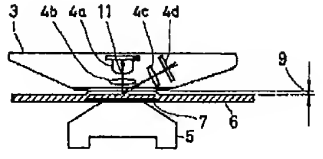
【図1】


A
8
信号処理
回路
1
3
4-2
2
4-1
6
9
10
B
5
7

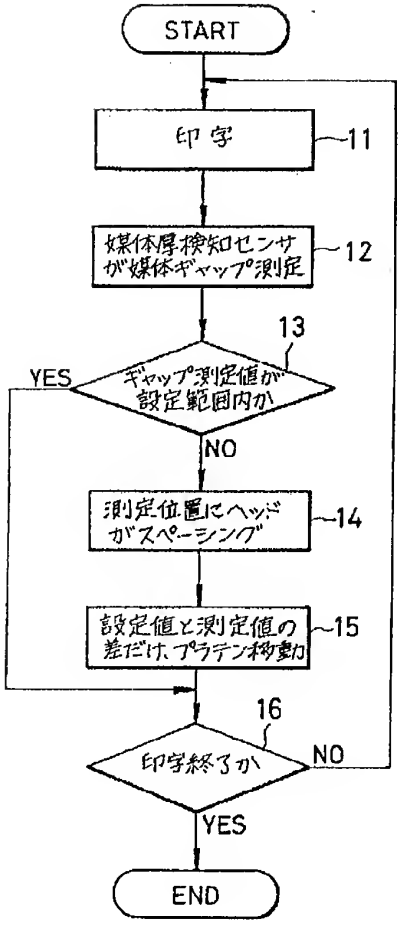
【図2】


A
1
6
3
4-2
2
4-1
9
10
5
C
7

【図3】


3
4b
4a
11
4c
4d
9
7
6
5

【図4】


START
印字
11
媒体厚検知センサが媒体ギャップ測定
12
13
ギャップ測定値が設定範囲内か
YES
NO
測定位置にヘッドがスペーシング
14
設定値と測定値の差だけ、プラテン移動
15
16
印字終了か
NO
YES
END

CLAIMS

[Claim(s)]

[Claim 1] It is the platen gap adjustment device of a printer in which it prints by the print head which moves to the printing medium on a platen with the advice member to which it shows said printing medium. A detection means to be established with predetermined distance from said print head in said advice member by the side of the migration direction front of said print head, and to detect the thickness of said printing medium, The platen gap adjustment device characterized by preparing the adjustment device which carries out adjustable [of the spacing of said platen and said print head] according to the detection result of said detection means.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the platen gap adjustment device of a printer in which the medium of ununiformity thickness is printed, about a platen gap adjustment device.

[0002]

[Description of the Prior Art] Conventionally, in order to adjust the platen gap between a print head and a platen in a platen gap adjustment device, a medium thickness detection device is established in front of a printer unit, and it has structure to which a platen is moved with an actuator according to the detection result of this medium thickness detection device.

[0003] On the other hand, a platen is fixed, the print head is energized to the platen side by the

spring, and there is also a thing of structure which evacuates a print head according to the thickness of a medium.

[0004] By such conventional platen gap adjustment device In order to print about a fixed platen gap until the next adjustment stage will come in the case of the structure of adjusting a platen gap according to the detection result of the medium thickness detection device established in front of the printer unit, once it adjusts a platen gap, There is a problem that printing is performed while the gap of a print head and a medium has been an ununiformity, when the thickness of a medium is an ununiformity, and poor printing may occur.

[0005] Moreover, in order to print in the case of the structure which fixes a platen and energizes a print head to a platen side by the spring, always forcing a print head on a medium, when printing by moving a print head, resistance by the medium becomes large and there is a problem that high-speed printing cannot be performed.

[0006]

[Objects of the Invention] This invention was made that the trouble of the above conventional things should be removed, can prevent generating of poor printing, and aims at offer of the platen gap adjustment device which can enable high-speed printing.

[0007]

[Elements of the Invention] The platen gap adjustment device by this invention to the printing medium on a platen It is the platen gap adjustment device of a printer in which it prints by the print head which moves with the advice member to which it shows said printing medium. A detection means to be established with predetermined distance from said print head in said advice member by the side of the migration direction front of said print head, and to detect the thickness of said printing medium, It is characterized by preparing the adjustment device which carries out adjustable [of the spacing of said platen and said print head] according to the detection result of said detection means.

[0008]

[Example] Next, one example of this invention is explained with reference to a drawing.

[0009] Drawing 1 is the block diagram showing one example of this invention. It sets to drawing, and the platen 5 is countered and arranged in the print head 1 so that a print head 1 and an ink ribbon 2, and a medium 6 may serve as a predetermined platen gap.

[0010] Moreover, the card holder 3 for guiding a medium 6 is attached in the member (not

shown) in which the print head 1 was attached. This card holder 3 performs a spacing together with a print head 1, when a print head 1 prints by moving in the direction of an arrow head A.

[0011] On both sides of the print head 1, the medium thickness detection sensor 4-1 and 4-2 are prepared [from the print head 1] in the platen 5 in this card holder 3, and the field which counters with predetermined distance, respectively in the direction of a spacing. While, as for these media thickness detection sensor 4-1 and 4-2, a print head 1 carries out the spacing of the medium 6 top, respectively, when printing, only predetermined distance is detecting the thickness of a medium 6 before rather than the location where the print head 1 is printing.

[0012] The thickness of the medium thickness detection sensor 4-1 and the medium 6 detected by 4-2 is sent out to a digital disposal circuit 8. A digital disposal circuit 8 performs data processing to the medium thickness detection sensor 4-1 and the detection result of 4-2, and is moved in the direction of an arrow head B with the actuator which does not illustrate a platen 5 based on this result of an operation.

[0013] Drawing 2 is drawing showing actuation of one example of this invention. In drawing, when the seal 7 is stuck on the rear face of a medium 6, actuation in case a print head 1 moves to the medium thickness detection sensor 4-1 side is shown.

[0014] In this case, the medium thickness detection sensor 4-1 sends out a detection result to a digital disposal circuit 8, if change of the thickness of a medium 6 is detected in the part on which the seal 7 was stuck in connection with the spacing of a print head 1. A digital disposal circuit 8 performs data processing to the medium thickness detection sensor 4-1 and the detection result of 4-2, and when a print head 1 reaches the part on which the seal 7 was stuck, it moves a platen 5 in the direction of an arrow head C with an actuator by the thickness change 9 to the platen datum plane 10 so that a print head 1 and a medium 6 may serve as a predetermined platen gap.

[0015] Then, if the part on which the seal 7 was stuck in connection with the spacing of a print head 1 is passed, the medium thickness detection sensor 4-1 will detect change of the thickness of a medium 6 again, and will notify it to a digital disposal circuit 8. Therefore, a digital disposal circuit 8 will move a platen 5 to the original location, i.e., the location of the platen datum level 10, if a print head 1 passes the part on which the seal 7 was stuck.

[0016] On the other hand, since change of the thickness of a medium 6 is detected by the medium thickness detection sensor 4-2 when a print head 1 moves to the medium thickness

detection sensor 4-2 side, a digital disposal circuit 8 moves a platen 5 according to the detection result of the medium thickness detection sensor 4-2.

[0017] Drawing 3 is drawing showing the configuration of the medium thickness detection sensor 4-1 of drawing 1 . In drawing, it is condensed by floodlighting lens 4b and the flux of light 11 by which outgoing radiation was carried out from light emitting device (LED) 4a of the medium thickness detection sensor 4-1 in a card holder 3 is irradiated on a medium 6. A part of beam of light by which diffuse reflection was carried out on the medium 6 passes light-receiving lens 4c, and it forms a spot on 4d (PSD) of location sensing elements.

[0018] At this time, the spot formation locations on 4d of location sensing elements differ in the time of not being stuck with the time of the seal 7 being stuck on the rear face of a medium 6. The electrical-potential-difference value from 4d of location sensing elements to a digital disposal circuit 8 changes with the differences in this spot formation location.

[0019] Since it has stored beforehand in the table which does not match and illustrate the electrical-potential-difference value from 4d of location sensing elements, and the thickness of a medium 6 in a digital disposal circuit 8, with reference to this table, the thickness of the medium 6 corresponding to the electrical-potential-difference value from 4d of location sensing elements is computed. A digital disposal circuit 8 moves a changed part of the thickness of the medium 6 which computed the platen 5, when a print head 1 moves only predetermined distance (i.e., when a print head 1 comes to the location where the seal 7 was stuck).

[0020] in addition, bringing close to the migration direction 1 of a platen 5, i.e., a print head, -- or the electrical-potential-difference value of 4d of location sensing elements determines to a reference value whether to keep away by size or fossete. Moreover, it has the same composition as the medium thickness detection sensor 4-1 which also mentioned above the configuration of the medium thickness detection sensor 4-2, and the actuation is the same as that of the medium thickness detection sensor 4-1.

[0021] Drawing 4 is a flow chart which shows actuation of one example of this invention. Actuation of one example of this invention is explained using these drawing 1 - drawing 4 .

[0022] While a print head 1 carries out the spacing of the medium 6 top, when printing (drawing 4 step 11), as for the medium thickness detection sensor 4-1 and 4-2, only predetermined distance is detecting the thickness of a medium 6 before rather than the location where the print head 1 is printing (drawing 4 step 12).

[0023] The thickness of the medium 6 which computed the digital disposal circuit 8 from the medium thickness detection sensor 4-1 and the electrical-potential-difference value change from 4-2 confirms whether to be the inside of a setting range (drawing 4 step 13). A digital disposal circuit 8 will judge whether it is printing termination, if the thickness of the computed medium 6 is in a setting range (drawing 4 step 16).

[0024] Moreover, if the thickness of the computed medium 6 is not in a setting range, when the spacing of the print head 1 has been carried out to the location which detected the thickness of a medium 6, only the difference of (the drawing 4 step 14), the set point, and measured value will move [digital disposal circuit / 8] a platen 5 (drawing 4 step 15). After that, a digital disposal circuit 8 judges whether it is printing termination (drawing 4 step 16).

[0025] Thus, the medium thickness detection sensor 4-1 and 4-2 are prepared in the card holder 3 which carries out a spacing with a print head 1. By computing the thickness of a medium 6 in front of predetermined distance, and making it move a platen 5 according to the calculation result rather than the printing location of a print head 1 by the medium thickness detection sensor 4-1, 4-2, and the digital disposal circuit 8 Since a platen 5 moves according to the thickness of a medium 6 even when printing to the medium 6 of ununiformity thickness, between a print head 1 and media 6 always serves as a predetermined platen gap. Therefore, poor printing, such as printing dirt and a poor printing location, can be prevented, and printing grace can be raised. Moreover, since resistance by the medium 6 can be made small when printing by moving a print head 1, if high-speed printing is enabled, it can **.

[0026]

[Effect of the Invention] As explained above, generating of poor printing can be prevented by according to this invention, having predetermined distance from a print head, forming a detection sensor in the advice member by the side of the migration direction front of a print head, and being made to carry out adjustable [of the spacing of a platen and a print head] according to the detection result of this detection sensor, and it is effective in the ability to **, if high-speed printing is enabled.

TECHNICAL FIELD

[Field of the Invention] Especially this invention relates to the platen gap adjustment device of a printer in which the medium of ununiformity thickness is printed, about a platen gap adjustment device.

PRIOR ART

[Description of the Prior Art] Conventionally, in order to adjust the platen gap between a print head and a platen in a platen gap adjustment device, a medium thickness detection device is established in front of a printer unit, and it has structure to which a platen is moved with an actuator according to the detection result of this medium thickness detection device.

[0003] On the other hand, a platen is fixed, the print head is energized to the platen side by the spring, and there is also a thing of structure which evacuates a print head according to the thickness of a medium.

[0004] By such conventional platen gap adjustment device In order to print about a fixed platen gap until the next adjustment stage will come in the case of the structure of adjusting a platen gap according to the detection result of the medium thickness detection device established in front of the printer unit, once it adjusts a platen gap, There is a problem that printing is performed while the gap of a print head and a medium has been an ununiformity, when the thickness of a medium is an ununiformity, and poor printing may occur.

[0005] Moreover, in order to print in the case of the structure which fixes a platen and energizes a print head to a platen side by the spring, always forcing a print head on a medium, when printing by moving a print head, resistance by the medium becomes large and there is a problem that high-speed printing cannot be performed.

[0006]

[Objects of the Invention] This invention was made that the trouble of the above conventional things should be removed, can prevent generating of poor printing, and aims at offer of the platen gap adjustment device which can enable high-speed printing.

[0007]

[Elements of the Invention] The platen gap adjustment device by this invention to the printing medium on a platen It is the platen gap adjustment device of a printer in which it prints by the print head which moves with the advice member to which it shows said printing medium. A detection means to be established with predetermined distance from said print head in said

advice member by the side of the migration direction front of said print head, and to detect the thickness of said printing medium, It is characterized by preparing the adjustment device which carries out adjustable [of the spacing of said platen and said print head] according to the detection result of said detection means.

EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, generating of poor printing can be prevented by according to this invention, having predetermined distance from a print head, forming a detection sensor in the advice member by the side of the migration direction front of a print head, and being made to carry out adjustable [of the spacing of a platen and a print head] according to the detection result of this detection sensor, and it is effective in the ability to **, if high-speed printing is enabled.

EXAMPLE

[Example] Next, one example of this invention is explained with reference to a drawing.

[0009] Drawing 1 is the block diagram showing one example of this invention. It sets to drawing, and the platen 5 is countered and arranged in the print head 1 so that a print head 1 and an ink ribbon 2, and a medium 6 may serve as a predetermined platen gap.

[0010] Moreover, the card holder 3 for guiding a medium 6 is attached in the member (not shown) in which the print head 1 was attached. This card holder 3 performs a spacing together with a print head 1, when a print head 1 prints by moving in the direction of an arrow head A.

[0011] On both sides of the print head 1, the medium thickness detection sensor 4-1 and 4-2 are prepared [from the print head 1] in the platen 5 in this card holder 3, and the field which counters with predetermined distance, respectively in the direction of a spacing. While, as for these media thickness detection sensor 4-1 and 4-2, a print head 1 carries out the spacing of the medium 6 top, respectively, when printing, only predetermined distance is detecting the thickness of a medium 6 before rather than the location where the print head 1 is printing.

[0012] The thickness of the medium thickness detection sensor 4-1 and the medium 6 detected by 4-2 is sent out to a digital disposal circuit 8. A digital disposal circuit 8 performs data processing to the medium thickness detection sensor 4-1 and the detection result of 4-2, and is moved in the direction of an arrow head B with the actuator which does not illustrate a platen 5

based on this result of an operation.

[0013] Drawing 2 is drawing showing actuation of one example of this invention. In drawing, when the seal 7 is stuck on the rear face of a medium 6, actuation in case a print head 1 moves to the medium thickness detection sensor 4-1 side is shown.

[0014] In this case, the medium thickness detection sensor 4-1 sends out a detection result to a digital disposal circuit 8, if change of the thickness of a medium 6 is detected in the part on which the seal 7 was stuck in connection with the spacing of a print head 1. A digital disposal circuit 8 performs data processing to the medium thickness detection sensor 4-1 and the detection result of 4-2, and when a print head 1 reaches the part on which the seal 7 was stuck, it moves a platen 5 in the direction of an arrow head C with an actuator by the thickness change 9 to the platen datum plane 10 so that a print head 1 and a medium 6 may serve as a predetermined platen gap.

[0015] Then, if the part on which the seal 7 was stuck in connection with the spacing of a print head 1 is passed, the medium thickness detection sensor 4-1 will detect change of the thickness of a medium 6 again, and will notify it to a digital disposal circuit 8. Therefore, a digital disposal circuit 8 will move a platen 5 to the original location, i.e., the location of the platen datum level 10, if a print head 1 passes the part on which the seal 7 was stuck.

[0016] On the other hand, since change of the thickness of a medium 6 is detected by the medium thickness detection sensor 4-2 when a print head 1 moves to the medium thickness detection sensor 4-2 side, a digital disposal circuit 8 moves a platen 5 according to the detection result of the medium thickness detection sensor 4-2.

[0017] Drawing 3 is drawing showing the configuration of the medium thickness detection sensor 4-1 of drawing 1 . In drawing, it is condensed by floodlighting lens 4b and the flux of light 11 by which outgoing radiation was carried out from light emitting device (LED) 4a of the medium thickness detection sensor 4-1 in a card holder 3 is irradiated on a medium 6. A part of beam of light by which diffuse reflection was carried out on the medium 6 passes light-receiving lens 4c, and it forms a spot on 4d (PSD) of location sensing elements.

[0018] At this time, the spot formation locations on 4d of location sensing elements differ in the time of not being stuck with the time of the seal 7 being stuck on the rear face of a medium 6. The electrical-potential-difference value from 4d of location sensing elements to a digital disposal circuit 8 changes with the differences in this spot formation location.

[0019] Since it has stored beforehand in the table which does not match and illustrate the electrical-potential-difference value from 4d of location sensing elements, and the thickness of a medium 6 in a digital disposal circuit 8, with reference to this table, the thickness of the medium 6 corresponding to the electrical-potential-difference value from 4d of location sensing elements is computed. A digital disposal circuit 8 moves a changed part of the thickness of the medium 6 which computed the platen 5, when a print head 1 moves only predetermined distance (i.e., when a print head 1 comes to the location where the seal 7 was stuck).

[0020] in addition, bringing close to the migration direction 1 of a platen 5, i.e., a print head, -- or the electrical-potential-difference value of 4d of location sensing elements determines to a reference value whether to keep away by size or fossete. Moreover, it has the same composition as the medium thickness detection sensor 4-1 which also mentioned above the configuration of the medium thickness detection sensor 4-2, and the actuation is the same as that of the medium thickness detection sensor 4-1.

[0021] Drawing 4 is a flow chart which shows actuation of one example of this invention. Actuation of one example of this invention is explained using these drawing 1 - drawing 4 .

[0022] While a print head 1 carries out the spacing of the medium 6 top, when printing (drawing 4 step 11), as for the medium thickness detection sensor 4-1 and 4-2, only predetermined distance is detecting the thickness of a medium 6 before rather than the location where the print head 1 is printing (drawing 4 step 12).

[0023] The thickness of the medium 6 which computed the digital disposal circuit 8 from the medium thickness detection sensor 4-1 and the electrical-potential-difference value change from 4-2 confirms whether to be the inside of a setting range (drawing 4 step 13). A digital disposal circuit 8 will judge whether it is printing termination, if the thickness of the computed medium 6 is in a setting range (drawing 4 step 16).

[0024] Moreover, if the thickness of the computed medium 6 is not in a setting range, when the spacing of the print head 1 has been carried out to the location which detected the thickness of a medium 6, only the difference of (the drawing 4 step 14), the set point, and measured value will move [digital disposal circuit / 8] a platen 5 (drawing 4 step 15). After that, a digital disposal circuit 8 judges whether it is printing termination (drawing 4 step 16).

[0025] Thus, the medium thickness detection sensor 4-1 and 4-2 are prepared in the card holder 3 which carries out a spacing with a print head 1. By computing the thickness of a medium 6 in

front of predetermined distance, and making it move a platen 5 according to the calculation result rather than the printing location of a print head 1 by the medium thickness detection sensor 4-1, 4-2, and the digital disposal circuit 8 Since a platen 5 moves according to the thickness of a medium 6 even when printing to the medium 6 of ununiformity thickness, between a print head 1 and media 6 always serves as a predetermined platen gap. Therefore, poor printing, such as printing dirt and a poor printing location, can be prevented, and printing grace can be raised. Moreover, since resistance by the medium 6 can be made small when printing by moving a print head 1, if high-speed printing is enabled, it can **.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing one example of this invention.

[Drawing 2] It is drawing showing actuation of one example of this invention.

[Drawing 3] It is drawing showing the configuration of the medium thickness detection sensor of drawing 1 .

[Drawing 4] It is the flow chart which shows actuation of one example of this invention.

[Description of Notations]

1 Print Head

3 Card Holder

4-1, 4-2 Medium thickness detection sensor

4a Light emitting device

4b Floodlighting lens

4c Light-receiving lens

4d Location sensing element

5 Platen

6 Medium

7 Seal

8 Digital Disposal Circuit